UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/685,983	10/15/2003	Yuriy Zakharov	G&C 184.2-US-I1	7100

22462   7590   06/04/2008
GATES & COOPER LLP
HOWARD HUGHES CENTER
6701 CENTER DRIVE WEST, SUITE 1050
LOS ANGELES, CA 90045

EXAMINER
DO, CHAT C

ART UNIT	PAPER NUMBER
2193	

MAIL DATE	DELIVERY MODE
06/04/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/685,983	ZAKHAROV ET AL.
	Examiner	Art Unit
	CHAT C. DO	2193

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS,
WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 April 2008*.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
  closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,11,13-44,47,49-73 and 75-80* is/are pending in the application.
  4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-9, 11, 13-44, 47, 49-73, 75-80* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  a)☐ All   b)☐ Some * c)☐ None of:
    1.☐ Certified copies of the priority documents have been received.
    2.☐ Certified copies of the priority documents have been received in Application No. _____.
    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).
  * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
  Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
  Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

1.   This communication is responsive to Amendment filed 04/02/2008.

2.   Claims 1-9, 11, 13-44, 47, 49-73 and 75-80 are pending in this application. Claims 1, 37,

39, 75 and 80 are independent claims.   In Amendment, claims 10, 12, 45-46, 48, 74 and 81-122

are cancelled. This Office Action is made non-final after a RCE filed 04/02/2008.

Claim Objections

3.   Claims 13, 38, 49 and 73 are objected to because of the following informalities:

        Re claim 13, the applicant is advised to change the dependency of this claim since

it is depending on the cancel claim 12.

        Re claim 38, the applicant is advised to write-out this claim in full for clarification

purposes.

        Re claim 49, it has similar objection as cited in claim 13.

        Re claim 73, it has similar objection as cited in claim 38.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making
> and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it
> pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode
> contemplated by the inventor of carrying out his invention.

5.   Claims 38 and 73 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply

with the enablement requirement. The claim(s) contains subject matter which was not described

in the specification in such a way as to enable one skilled in the art to which it pertains, or with

which it is most nearly connected, to make and/or use the invention.

        Re claims 38 and 73, these claims are directed to an article of manufacture

comprising a computer program storage device. However, the original specification fails

to address any article of manufacture comprising a computer program storage device as

newly amended by the applicant. At most, the original specification mentions about

program code, but does not mention anything about the article of manufacture or type of

program storage device in order to enable one skilled in the art to make and/or use the

invention.

Claim Rejections - 35 USC § 101

6.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or
> any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and
> requirements of this title.

7.   Claims 1-9, 11, 13-44, 47, 49-73 and 75-80 are rejected under 35 U.S.C. 101 because the

claimed invention is directed to non-statutory subject matter.

        Claims 1-9, 11, 13-44, 47, 49-73 and 75-80 cite a method and apparatus for

solving a system of N linear equations in accordance with a mathematical algorithm.

However, claims 1-9, 11, 13-44, 47, 49-73 and 75-80 merely disclose mental

steps/components for solving a system of N linear equations without disclosing a

practical/physical application as tangible result. Further, the claims appear to preempt

every substantial practical application of the idea embodied by the claims. Even though,

the claims mention about the application in which it is necessary to solve the system of

linear equation, however this application is mathematical application. In addition, claims

38 and 73 are logically and reasonable interpreted as a non-tangible medium since the

storage device for carrying the computer readable program code instead of storing the

computer readable program code. Therefore, claims 1-9, 11, 13-44, 47, 49-73 and 75-80

are directed to non-statutory subject matter.

Claim Rejections - 35 USC § 102

8.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on
> sale in this country, more than one year prior to the date of application for patent in the United States.

9.   Claims 1-9, 11, 13-25, 30-44, 47, 49-61, 66-73 and 75-80 are rejected under 35

U.S.C. 102(b) as being anticipated by Simon ("An Overlaying Technique for Solving Linear

Equations in Real-Time Computing").

Re claim 1, Simon discloses in Figure 1 a method for solving a system of N linear

equations in N unknown variables (e.g. abstract and expression 2 in page 513), the

method comprising: (a) storing an estimate value for each unknown variable in a

processor (e.g. $x_{initial}$ in Figure 1 and "Acceleration of the Computational Procedures"

section in page 516); (b) initializing, in the processor, each estimate value to a

predetermined value (e.g. $x_{initial}$ in Figure 1), and establishing, in the processor, a

respective auxiliary value for each estimate value (e.g. paragraph right under expression 9

in page 515 and "Finding a Solution for a Set of Linear Equations" section in page 515);

(c) for each estimate value (e.g. for looping as seen in Figure 1 and "Preparing for the

Next Cycle" section in page 516): (i) determining, in the processor, whether a respective

predetermined condition is satisfied, the predetermined condition involving the respective

auxiliary value (e.g. Figure 1 and "Preparing for the Next Cycle" section in page 516 as it

meets the condition for moving to the next loop/cycle of computation); and (ii) updating,

the processor, the estimate if and only if the respective predetermined condition is

satisfied (e.g. as not meet within threshold/condition in Figure 1); and (d) repeating step

(c) a plurality of times (e.g. Figure 1 and "Preparing for the Next Cycle" section in page

516); and outputting the estimate values from the processor to provide an estimate of a

solution to said system of linear equations for an application in which it is necessary to

solve said system of linear equations (e.g. abstract and "Introduction" section in page

513).

Re claim 2, Simon further discloses in Figure 1 updating comprises adding a

scalar value d to the respective estimate value, or subtracting a scalar value d from the

respective estimate value (e.g. expressions 17-22 in page 515).

Re claim 3, Simon further discloses in Figure 1 scalar value d is updated in a

predetermined manner (e.g. "Transformation to Residuals" section in page 515).

Re claim 4, Simon further discloses in Figure 1 scalar value d is updated when

and only when step (c) updates no estimate values (e.g. Figure 1).

Re claim 5, Simon further discloses in Figure 1 updating divides d by a scalar

update value (e.g. expressions 11-16 in page 515).

Re claim 6, Simon further discloses in Figure 1 the scalar update value is equal to

a power of two (e.g. binary value in expressions 11-16 in page 515).

Re claim 7, Simon further discloses in Figure 1 the scalar update value is equal to

two (e.g. as power to one in binary value in expressions 11-16 in page 515).

Re claim 8, Simon further discloses in Figure 1 each of estimate values is

initialised to be equal to zero (e.g. $x_{initial}$ in Figure 1).

Re claim 9, Simon further discloses in Figure 1 the respective predetermined

condition for each respective estimate value does not involve the respective estimate

value (e.g. Figure 1 and "Preparing for the Next Cycle" section in page 516).

Re claim 11, Simon further discloses in Figure 1 auxiliary values form an

auxiliary vector Q (e.g. expressions 11-22 in page 515).

Re claim 13, Simon further discloses in Figure 1 a plurality of auxiliary values are

associated with each estimate value (e.g. expressions 10-22 in page 515).

Re claim 14, Simon further discloses in Figure 1 the predetermined condition for

a respective estimate value involves the maximum amongst the plurality auxiliary values

(e.g. Figure 1 and "Preparing for the Next Cycle" section in page 516).

Re claim 15, Simon further discloses in Figure 1 the minimum value is compared

with a threshold value (e.g. as comparing with as seen in Figure 1 and "Preparing for the

Next Cycle" section in page 516).

Re claim 16, Simon further discloses in Figure 1 the condition is satisfied if the minimum value is less than the threshold value ("Preparing for the Next Cycle" section in page 516 and Figure 1).

Re claim 17, Simon further discloses in Figure 1 the plurality of auxiliary values for a respective estimate value consist of a first auxiliary value, and second auxiliary value which is the negative of the first auxiliary value (e.g. lower and upper bound by computing the norm in Figure 1 and "Preparing for the Next Cycle" section in page 516).

Re claim 18, Simon further discloses in Figure 1 the threshold value for the nth unknown variable is the scale value d multiplied by the coefficient of the nth unknown variable in the nth equation (e.g. "Introduction" section in page 515).

Re claim 19, Simon further discloses in Figure 1 one of a plurality of update is selected in the condition is satisfied (e.g. expressions 10-22 in page 515).

Re claim 20, Simon further discloses in Figure 1 the scalar value d is added to the respective estimate value if the condition is satisfied and minimum value is the first auxiliary value (e.g. as next cycle of operation and "Preparing for the Next Cycle" section in page 516).

Re claim 21, Simon further discloses in Figure 1 the scalar value d is subtracted from the respective estimate value if the condition is satisfied and minimum value is the second auxiliary value (e.g. by the direction of error E in expression 11 in page 515).

Re claim 22, Simon further discloses in Figure 1 the first auxiliary value for the nth unknown variable is initially set to be equal to the negative of the right hand side of the nth equation (e.g. as b_{old} in expression 16 in page 515).

Re claim 23, Simon further discloses in Figure 1 the first auxiliary value for the nth unknown variable is initially set to be equal to the negative of the right hand side of the nth equation (e.g. as b_{old} in expression 16 in page 515).

Re claim 24, Simon further discloses in Figure 1 the respective first and second auxiliary values are updated if the condition is satisfied (e.g. Figure 1 and "Preparing for the Next Cycle" section in page 516).

Re claim 25, Simon further discloses in Figure 1 the first and second auxiliary values associated with each estimate value are updated if the condition is satisfied (e.g. Figure 1 and "Preparing for the Next Cycle" section in page 516).

Re claim 30, Simon further discloses in Figure 1 the scalar value d is updated such that the algorithm updates the estimate values in a bitwise manner, beginning with the most significant bit (e.g. Figure 1 and "Preparing for the Next Cycle" section in page 516).

Re claim 31, Simon further discloses in Figure 1 step (d) is carried out until a predetermined condition is satisfied (e.g. Figure 1 and "Preparing for the Next Cycle" section in page 516).

Re claim 32, Simon further discloses in Figure 1 predetermined condition is a maximum number of iterations without an update to the scalar value d (e.g. Figure 1 and "Preparing for the Next Cycle" section in page 516).

Re claim 34, Simon further discloses in Figure 1 the accurate solution of the equations is known to lie between upper and lower bounds, and the algorithm seeks a

solution between upper and lower bounds (e.g. Figure 1 and "Preparing for the Next Cycle" section in page 516 by computing the norm).

Re claim 35, Simon further discloses in Figure 1 estimate values are initialised to a value which is within upper and lower bounds (e.g. Figure 1 and "Preparing for the Next Cycle" section in page 516 by computing the norm).

Re claim 36, Simon further discloses in Figure 1 estimate values are initialised to a value positioned at the midpoint of upper and lower bounds (e.g. Figure 1 and "Preparing for the Next Cycle" section in page 516 by computing the norm).

Re claim 37, it is an apparatus claim of claim 1. Thus, claim 37 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 38, it is a data carrier claim of claim 1. Thus, claim 38 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 39, it has similar limitations cited in claim 4. Thus, claim 39 is also rejected under the same rationale as cited in the rejection of rejected claim 4.

Re claim 40, it has similar limitations cited in claim 2. Thus, claim 40 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 41, it has similar limitations cited in claim 5. Thus, claim 41 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

Re claim 42, it has similar limitations cited in claim 6. Thus, claim 42 is also rejected under the same rationale as cited in the rejection of rejected claim 6.

Re claim 43, it has similar limitations cited in claim 7. Thus, claim 43 is also rejected under the same rationale as cited in the rejection of rejected claim 7.

Re claim 44, it has similar limitations cited in claim 8. Thus, claim 44 is also rejected under the same rationale as cited in the rejection of rejected claim 8.

Re claim 47, it has similar limitations cited in claim 11. Thus, claim 47 is also rejected under the same rationale as cited in the rejection of rejected claim 11.

Re claim 49, it has similar limitations cited in claim 13. Thus, claim 49 is also rejected under the same rationale as cited in the rejection of rejected claim 13.

Re claim 50, it has similar limitations cited in claim 14. Thus, claim 50 is also rejected under the same rationale as cited in the rejection of rejected claim 14.

Re claim 51, it has similar limitations cited in claim 15. Thus, claim 51 is also rejected under the same rationale as cited in the rejection of rejected claim 15.

Re claim 52, it has similar limitations cited in claim 16. Thus, claim 52 is also rejected under the same rationale as cited in the rejection of rejected claim 16.

Re claim 53, it has similar limitations cited in claim 17. Thus, claim 53 is also rejected under the same rationale as cited in the rejection of rejected claim 17.

Re claim 54, it has similar limitations cited in claim 18. Thus, claim 54 is also rejected under the same rationale as cited in the rejection of rejected claim 18.

Re claim 55, it has similar limitations cited in claim 19. Thus, claim 55 is also rejected under the same rationale as cited in the rejection of rejected claim 19.

Re claim 56, it has similar limitations cited in claim 20. Thus, claim 56 is also rejected under the same rationale as cited in the rejection of rejected claim 20.

Re claim 57, it has similar limitations cited in claim 21. Thus, claim 57 is also rejected under the same rationale as cited in the rejection of rejected claim 21.

Re claim 58, it has similar limitations cited in claim 22. Thus, claim 58 is also rejected under the same rationale as cited in the rejection of rejected claim 22.

Re claim 59, it has similar limitations cited in claim 23. Thus, claim 59 is also rejected under the same rationale as cited in the rejection of rejected claim 23.

Re claim 60, it has similar limitations cited in claim 24. Thus, claim 60 is also rejected under the same rationale as cited in the rejection of rejected claim 24.

Re claim 61, it has similar limitations cited in claim 25. Thus, claim 61 is also rejected under the same rationale as cited in the rejection of rejected claim 25.

Re claim 66, it has similar limitations cited in claim 31. Thus, claim 66 is also rejected under the same rationale as cited in the rejection of rejected claim 31.

Re claim 67, it has similar limitations cited in claim 32. Thus, claim 67 is also rejected under the same rationale as cited in the rejection of rejected claim 32.

Re claim 68, it has similar limitations cited in claim 33. Thus, claim 68 is also rejected under the same rationale as cited in the rejection of rejected claim 33.

Re claim 69, it has similar limitations cited in claim 34. Thus, claim 69 is also rejected under the same rationale as cited in the rejection of rejected claim 34.

Re claim 70, it has similar limitations cited in claim 35. Thus, claim 70 is also rejected under the same rationale as cited in the rejection of rejected claim 35.

Re claim 71, it has similar limitations cited in claim 36. Thus, claim 71 is also rejected under the same rationale as cited in the rejection of rejected claim 36.

Re claim 72, it is an apparatus claim of claim 39. Thus, claim 72 is also rejected under the same rationale as cited in the rejection of rejected claim 39.

Re claim 73, it is a data carrier claim of claim 39. Thus, claim 73 is also rejected

under the same rationale as cited in the rejection of rejected claim 39.

Re claim 75, it is a computer processor claim of claim 1. Thus, claim 75 is also

rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 76, it is a computer processor claim of claim 2. Thus, claim 76 is also

rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 77, it is a computer processor claim of claim 6. Thus, claim 77 is also

rejected under the same rationale as cited in the rejection of rejected claim 6.

Re claim 78, it is a computer processor claim of claim 7. Thus, claim 78 is also

rejected under the same rationale as cited in the rejection of rejected claim 7.

Re claim 79, it has similar limitations cited in claim 3. Thus, claim 79 is also

rejected under the same rationale as cited in the rejection of rejected claim 3.

Re claim 80, it is a computer processor claim of claim 1. Thus, claim 80 is also

rejected under the same rationale as cited in the rejection of rejected claim 1.

Claim Rejections - 35 USC § 103

10.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

11.   Claims 27-29 and 63-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Simon ("An Overlaying Technique for Solving Linear Equations in Real-Time Computing")

Re claims 27-29, Simon fails to disclose in Figure 1 each estimate value is represented as a fixed point binary word; a floating point binary word; or a complex number. However, the examiner takes an Office notice that the value is represented as a fixed point binary word; a floating point binary word; or a complex number is well known in the art of the technology and widely used in many practical applications.

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to have the value is presented as a fixed point binary word; a floating point binary word; or a complex number into Simon's invention because it would enable to enhance the system flexibility.

Re claim 63, it has similar limitations cited in claim 27. Thus, claim 63 is also rejected under the same rationale as cited in the rejection of rejected claim 27.

Re claim 64, it has similar limitations cited in claim 28. Thus, claim 64 is also rejected under the same rationale as cited in the rejection of rejected claim 28.

Re claim 65, it has similar limitations cited in claim 29. Thus, claim 65 is also rejected under the same rationale as cited in the rejection of rejected claim 29.

Response to Amendment

12.   The amendment filed 04/02/2008 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

The limitation "an article of manufacture comprising a computer program storage device" is considered as new matter introduced into the original disclosure.

Applicant is required to cancel or clearly point-out the new matter in the original specification in the reply to this Office Action.

Response to Arguments

13.   Applicant's arguments with respect to claims 1-9, 11, 13-44, 47, 49-73 and 75-80 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

14.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a.   U.S. Patent Publication Application No. 2003/0050946 to Walster et al. disclose a termination criteria for the interval version of Newton's method for solving systems of non-linear equations.

b.   U.S. Patent No. 5,867,416 to Feldmann et al. disclose an efficient frequency domain analysis of large nonlinear analog circuits using compressed matrix storage.

c.   U.S. Patent No. 5,673,210 to Etter discloses a signal restoration using left-sided and right-sided autoregressive parameters.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (571) 272-3721. The examiner can normally be reached on M => F from 7:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Lewis Bullock can be reached on (571) 272-3759. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Chat C. Do/
Primary Examiner, Art Unit 2193

June 2, 2008